We claim:

1. A process for producing a membrane electrode assembly for fuel cells containing a polymer electrolyte membrane having a first and a second surface parallel to each other, said first surface forming a firm composite with a first catalyst layer and a first water repellent gas distribution layer and said second surface forming a firm composite with a second catalyst layer and a second water repellent gas distribution layer, comprising applying each of said first catalyst layer and said second catalyst layer to or contacting with the respective surfaces of the polymer electrolyte membrane successively, wherein during the application or contacting process to one surface, always an opposite surface of the membrane is supported, said catalyst layers being prepared by using an ink containing an electrocatalyst, one at least solvent, proton-conducting ionomer and optionally a water repelling agents and a pore-forming agent.

2. The process according to Claim 1, further comprising wherein a polymer electrolyte membrane is used the first surface of which is readily accessible and the second surface of which is supported by a backing film and

a) producing a composite of said first surface with the first catalyst layer and the first water repellent gas distribution layer,

b) removing the backing film from the second surface of the membrane,

c) producing the composite of said second surface with the second catalyst layer and the second gas distribution layer.

3. The process according to Claim 2, wherein
process step a) includes

a1) coating the first surface of the membrane with the first catalyst layer using a first ink and

a2) laying the first gas distribution layer on the still moist catalyst layer and drying the composite.

4. The process according to Claim 3, wherein ink for producing the first catalyst layer contains predominantly organic solvents.

5. A process according to Claim 4, wherein
process step c) includes:

c1) coating the second surface of the membrane with the second catalyst layer using a second ink and

c2) laying the second gas distribution layer on the still moist catalyst layer and drying the composite.

6. The process according to Claim 5, wherein the ink for producing the second catalyst layer contains predominantly organic solvents.

7. The process according to Claim 4, wherein
process step c) includes

c3) coating the second gas distribution layer with the second catalyst layer using a second ink and

c4) laying the still moist catalyst layer on the second surface of the membrane and drying the composite.

8. The process according to Claim 7, wherein ink for producing the second catalyst layer contains predominantly water as solvent.

9. The process according to Claim 8, wherein the first catalyst layer forms the cathode and the second catalyst layer forms the anode in the membrane electrode assembly.

10. The process according to Claim 4, wherein
process step c) includes

c5) coating the second gas distribution layer with the second catalyst layer using a second ink and drying the coating and

c6) laying the catalyst layer on the second surface of the membrane and

d) compressing the entire composite at elevated temperature.

11. The process according to Claim 11, w herein ink for producing the second catalyst layer contains predominantly water as solvent.

12. The process according to Claim 11, wherein the first catalyst layer forms the cathode and the second catalyst layer forms the anode in the membrane electrode assembly.

13. The process according to Claim 2, further comprising wherein process steps a) and c) includes

a3) coating the first gas distribution layer with the first catalyst layer using a first ink and drying the coating,

a4) moistening the first catalyst layer with an organic ionomer solution and

a5) laying the moistened first catalyst layer on the first surface of the membrane and drying the composite,

c7) coating the second gas distribution layer with the second catalyst layer using a second ink and drying the coating,

c8) moistening the second catalyst layer with an organic ionomer solution and

c9) laying the moistened second catalyst layer on the second surface of the membrane and drying the composite.

14. The process according to Claim 13, ink for producing the catalyst layers contain predominantly water as solvent.

15. The process according to Claim 1, wherein the gas distribution layers are coated with a carbon-containing, hydrophobic microporous layer before making contact with the relevant catalyst layer.

16. The process according to Claim 15, wherein the catalyst layers are washed at elevated temperature after drying.

17. The process according to Claim 1, wherein the polymer electrolyte membrane and gas distribution layers are used in the form of rolled goods and the entire process takes place continuously.

18. The process according to Claim 17, wherein the catalyst layers are washed at elevated temperature after drying.

19. The process according to Claim 1, wherein the catalyst layers are applied to the polymer electrolyte membrane and gas distribution layers by spraying, brushing or printing.

20. The process according to Claim 1, wherein the catalyst layers are applied to the strip-shaped polymer electrode membrane in the geometric dimensions required for fuel cells by means of screen printing and said gas distribution layers are laid precisely on the catalyst layers using sheet feeders.

21. The process according to Claim 1, wherein the polymer electrolyte membrane is preswollen in water or organic solvents before application of or making contact with the catalyst layers.

22. A membrane electrode assembly produced by the method according to claim 1.

23. A fuel cell containing the membrane electrode assembly according to claim 22.